

**A comparison of quantitative imaging techniques for ceramic materials**  
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This work compares the effectiveness of five different imaging methods for porous preforms made from ceramic fibers. The methods are acoustic attenuation, x-ray tomography, radiography (x-ray attenuation), optical attenuation, and dual-band infrared imaging. The preform properties evaluated are fiber concentration, cracks, voids, surface defects and contamination. Preforms with varying fiber concentration, preform thickness, and fiber type have been examined. All the methods allow density variations to be mapped. X-ray tomography has the highest contrast and sensitivity to defects but is slow if the entire preform is scanned. The attenuation methods are orders of magnitude faster and less expensive, but average over the thickness in the viewing direction and have less sensitivity to voids and cracks. Of the line-of-sight attenuation methods, radiography has the highest resolution and contrast. Acoustic imaging is most sensitive to surface aberrations.

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